CEDR TRANSNATIONAL ROAD RESEARCH PROGRAMME

Call 2017

Collaborative Planning of Infrastructure and Spatial Development

CEDR Transnational Road Research Programme

funded by

Austria, Finland, Netherlands, Norway, Sweden
and the United Kingdom

Description of Research Needs (DoRN)

November 2017

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Authors of the DoRN:

Philipp Rosenecker	Austria, ASFINAG
Seppo Serola	Finland, Finnish Transport Agency
Yves De Beleyr	Flanders, Department of Mobility and Public Works
Eoin Gillard	Ireland, Transport Infrastructure Ireland
Jos Arts	Netherlands, Rijkswaterstaat
Sjaak van der Werf	Netherlands, Rijkswaterstaat
James Odeck	Norway, Vegvesen
Tomas Homlund	Sweden, Trafikverket
Vivi Michalaki	United Kingdom, Highways England

1 General introduction

This Call for Proposals is launched by the Conference of European Directors of Roads (CEDR). CEDR is an organisation which brings together the directors of 27 European road authorities. The aim of CEDR is to promote excellence in the management of roads. The website www.cedr.eu contains a full description of its structure and activities.

CEDR recognises the importance of research in the development of sustainable transport and has established a Working Group (WG) to monitor European research activities and to advise the CEDR Governing Board (GB) on issues relating to research. WG Innovation (WGI) responsibilities include dissemination of research results as well as initiating research programmes that support CEDR members in current and future situations.

CEDR gave a mandate to its Working Group Innovation (WGI) to identify opportunities for further transnational road research programmes on the basis of the excellent start and of the experience gained during the ERA-NET ROAD project. CEDR also requested that:

- WGI only proposes suitable research topics and identifies good research proposals;
- WGI presents research proposals, when appropriate, to the CEDR GB for decision; the CEDR GB will decide what programmes are taken forward;
- all call procedures shall be open and transparent and all European countries shall be invited to participate, with no advantages given to preferred suppliers or groups of suppliers; and
- the costs of developing and managing the transnational calls shall be supported only by those CEDR members taking part in the programme.

2 Introduction to Call 2017

The CEDR Transnational Research Programme was developed initially within the framework of ENR and was then taken forward by WG Innovation to fulfil the common interests of the National Road Administration (NRA) members of CEDR.

The participating NRAs in this Call are Austria, Finland, Netherlands, Norway, Sweden and the United Kingdom. As in previous collaborative research programmes, the participating members will establish a Programme Executive Board (PEB) made up of experts in the topics to be covered. The Common Obligation Programme Model from the "ENR-toolkit" has been adopted, with some modifications to take account of the role of WG Innovation in the process. The research budget will be jointly provided by the NRAs who provide participants to the PEB as listed above. PEB members will designate one of them to act as chair.

WG Innovation has, on behalf of CEDR, appointed a Programme Manager (ProgM) to take over the administration of this Call for Proposals. For this programme, the ProgM will be the Austrian Research Promotion Agency. Responsibilities of the ProgM include preparation of the Call for Proposals, financial management of the programme and setting up and managing the contracts with the research providers. These responsibilities will be conducted by the ProgM in its country under its law and regulations under the direction of WG Innovation. The terms under which the ProgM and PEB will operate will be set out in a Collaboration Agreement, signed by senior representatives of each participating NRA.

Applications are invited from suitable qualified consortia in response to this Call for Proposals. Consortia must consist of at least two legal entities from different European countries. Individuals and organisations involved in the formulation of the Call specification are prohibited from any involvement in proposals. Applications should focus on the sharing of national research, knowledge and experience at all levels as an important prerequisite for achieving the goals of CEDR and its members. It is particularly important that the results can be easily implemented through various demonstration projects in order to contextualise **the benefits of the transnational collaboration.** The applications will be evaluated by the PEB in relation to:

- Extent to which the proposal meets the requirement of the DoRN
- Technical quality of proposal
- Track record of consortium members
- Management of project
- Value for money
- Vision on the topic.

Details of these evaluation criteria and how they will be interpreted and applied by the PEB are presented in the Guide for Applicants (GfA), which accompanies this Call for Proposals.

3 Aim of the Call

This research programme focuses on the need for developing a common framework to obtain the synergies from interactive planning of infrastructure and spatial development ('collaborative planning').

The aim is to produce synergies that result in a higher return on investments relating to:

- More robust multi-modal accessibility
- Added value to spatial-economic development
- Improved sustainability and liveability
- Enhanced societal support
- Reduced costs of mitigation and planning time, and
- Diversification of financing sources (co-funding by other authorities and infra users).

The research is expected to provide National Road Authorities (NRAs) insight into optimizing collaborative planning and to produce specific tools to enable NRAs to do collaborative planning of multi-modal infrastructure and spatial development serving multiple objectives.

The call has three sub-themes:

A: Exploring effective approaches for future-proof road networks based on trends in mobility and spatial development

B: Planning and designing the interface between (trans)national road networks and local transportation ('last mile')

C: Assessing the added value from spatial development as a factor in infrastructure planning.

Applicants should ensure their project proposals are clearly linked to one or more of the three objectives listed above. Proposals should emphasise the trans-national benefit of the project outcomes for the participating Road Authorities in the context of getting the most out of Intelligent Infrastructure (these will be high level, generic benefits and it is up to the road authority to apply those to its own network to exploit those benefits).

4 Reasons for the Transnational Research Programme

National Road Authorities (NRAs) face increasing pressure to integrate their road network service provision with, often conflicting, *societal trends* and conditions, such as congestion, changes in mobility, environmental issues, climate change, changing societal needs. Many of these trends are also identified in CEDR's strategic plan and EU policy. These trends have already started and addressing them well will become central to NRAs' social-license-to-operate and leads to a different role for NRAs.

NRAs have a need for *innovative approaches*, as current practices to overcome these conflicts are increasingly expensive and time consuming and cannot be sustained. NRAs see that they cannot be mere providers and managers of roads anymore and that society asks for efficient and seamless mobility, societal return on investments in infrastructure and a significant reduction of the negative effects on environment and people (cf. CEDR's Strategic Plan). NRAs feel the need to provide for this, focusing on the users of the networks as well as the people and companies in the surrounding regions. In order to address this challenge, NRAs need innovative approaches that can reconcile the opposing interests and drive

support for the resulting arrangement. Such innovative approaches need to address the multi-dimensional nature of the challenges: infrastructure network, multi-modal mobility, spatial development, timing, valuation as well as institutional and governance dimensions.

This research call starts from the *road network* because of its versatility: comprising both freight as well as passengers transport, being an essential element of multi-modal mobility, and providing transportation at both the local, urban-regional and (inter)national level. When responding to changes in mobility and infrastructure, it is vital that NRAs reduce the environmental impact as much as possible. Also, NRAs need to enhance the added value of infrastructure for society by developing and managing infrastructure that increases the economic competitiveness, sustainability, liveability and spatial quality of (peri-urban) regions. This joint multi-modal infrastructure and spatial planning requires careful collaboration between NRAs, other transport authorities and planning administrations at different levels of scale as well as cooperation with market parties and stakeholders ('multi-level governance'). The central question is how to achieve integrated project development of infrastructure and its spatial surroundings?

These challenges are most pressing in the so-called *Daily Urban Systems* (DUS), which form the interface between long-distance transport across European corridors and local last-mile urban transportation. Here the competition between the various spatial and economic functions – such as housing, industry, facilities, logistics and transport infrastructure – is most fierce. At the DUS, spatial and environmental conflicts are most pressing and here it can be expected that the potential of socio-economic benefits of well-planned and managed infrastructure and spatial development is the highest. Regarding this, intermodal links of road networks to the other modes through hubs for freight as well as for passengers are crucial.

In relation to the main question: "how to achieve integrated development of infrastructure and its spatial surroundings?", CEDR's members see *three important issues* that should be addressed: (A) exploring, (B) designing and (C) assessing integrated spatial and infrastructure development. The first issue (A) relates to providing insight in future trends in mobility and spatial development and, in relation to this, what are smart, innovative concepts and measures (here 'smart' is considered not only technically but also spatially and socially). Issue B (of planning and designing) relates to creating and implementing combinations of spatial and multi-modal infrastructure development, focusing specifically on the interface of (trans)national networks and local transportation (the 'last mile'). Issue C, regards the assessment of the added-value of integrated designs and plans in order to clarify the societal relevance – the 'business case' – of collaborative planning for NRAs and their partners, and to enable capturing the added-value for realizing integrated development (in relation to co-financing). Issues A, B and C are three distinctive but related topic areas: insight in trends and measures (A) is needed in order to enable planning and design of integrated development for a specific case (B), which calls for an assessment that clarifies the business case for such integrated development and that forms the basis for capturing of its value (C). Finally, such assessment approaches should reflect future trends and provide insight in the effectiveness of measures (issue A).

In the past, there has been done research into specific elements – e.g., into future trends and mobility measures, into the assessment of costs, benefits and impacts, and into value capturing – however these studies are usually rather sectoral and technical oriented. Many knowledge gaps still exist, in relation to the *combined approaches* of multi-modal infrastructure and spatial development. This concerns especially the translation to NRAs' practice. Particularly, as such collaborative planning is for many NRAs not standard practice. Regarding the latter, interactive approaches – such as living labs, workshops, test beds – are viewed relevant in order to provide NRAs good understanding of the interaction between spatial and infrastructure development and how collaborative planning for combined development can be practically done in different contexts ('learning by doing').

5 Research Objectives

This research programme focuses on three areas with the following objectives and expected outputs (see below, under A, B, C). The call invites proposals for these three areas.

5.1 Topic A: Exploring effective approaches for future-proof road networks based on trends in mobility and spatial development

CEDR's members are challenged from highly dynamic trends in mobility and their drivers from policy, economy, society and technology. The mix of incremental and disruptive developments drives their need for robust, future-proof responses, in which adaptability is a key aspect. Whatever reality develops over time, it can be expected that in Europe's urban regions the pressure on road infrastructure will be highest, as car mobility provides important advantages being flexible and versatile (for both persons and freight). As a consequence, without innovative integrated approaches NRAs will be confronted with considerable congestion especially in urban regions.

NRAs need to have good *insight in future trends* in mobility and spatial development*,* their probability and the consequences for their network management to keep their road-networks future-proof and adaptable to changing contexts, and enable well-informed decision-making future investments. First of all, this regards insight in future trends in mobility, such as: growth of passengers and freight transport, growth of transport in the various modalities, changes in mobility behaviour, new concepts regarding the various modalities (e.g. information technology and data, Intelligent Transport Systems – ITS). Also it concerns insight in spatial developments, such as: urban and economic growth, environmental issues, and spatial development patterns and concepts – location choice and activity patterns. This relates also to insights in new logistic concepts, concepts as Mobility as a Service (MaaS), shared mobility, information technology (data, apps etc.), innovative ways for ensuring transport modes' seamless interconnection and accommodate spatial-economic growth and urban expansion (housing, working, facilities).

In order to achieve *future-proof road networks (*with are effectively used from a societal viewpoint) integrated approaches to multi-modal infrastructure and spatial development are vital. Experiences show that smart combinations of small measures at the local scale may help in solving bottlenecks at the Daily Urban System level and the level of national road networks. Such approaches are effective, because a substantial part of traffic on the national roads in urban areas is only local or regional traffic thereby limiting the capacity for long-distance end-users (both freight and persons). At the level of the Daily Urban System (DUS) next to car transport also other modalities are relevant, especially to the local and regional end-users, such as: rail, metro, tram, bus, (e-)bike, walking. As a consequence, combinations of local and regional mobility measures regarding different modalities as well as spatial measures may reduce traffic sufficiently to solve congestion bottlenecks at the DUS. Such integrated approaches require careful *coordination and collaboration* of NRAs with other authorities responsible for other modalities as well as spatial planning at national, regional and local level[1].

[1] For instance, experiences in the Netherlands (the so-called 5 i's of the 'Accessing More' – in Dutch 'Meer Bereiken' – approach) show that next to enlarging infrastructure packages of other (soft) measures may provide robust responses to mobility growth in urban areas. These measures regard: 1) innovating in order to react and

In selecting effective packages of measures to deal with future trends, it is important to take into account the specific spatial context (the 'urban fabric') – especially as NRAs are responsible for nation-wide infrastructure networks. In urban core areas of a DUS the urban fabric is high density allowing for multi-modality that includes not only public transport but also active modes such as walking and cycling. Low-density sub-/peri-urban parts of a DUS are usually more car-dependent as public transport is often not viable. However, here innovative mobility concepts such as e-bikes, shared mobility may become relevant. Regarding inter-urban transport (persons and freight) multi-modal infrastructure corridors are relevant to enhance future-proof road networks.

Scope: much information regarding this is already available, however combining this information about future trends and measures/concepts for effective approaches to deal with them is missing. Focus is on providing insights in trends in mobility and spatial development, and in innovative measures / concepts that can deal with these combined trends in multi-modal transport and spatial development – at which emphasis is at the DUS level.

Main challenges:

- *Mobility growth* may lead to increasing use and congestion of the road network, resulting in more users than the (existing) network can handle. Regarding this, especially urban regions are important as here will be most pressure on the road network.
- *Different use of road networks* The use of the road network is different from 50 years ago (heavier vehicles, much more intense use, 24/7 use) and the surrounding areas around the network have also changed (new spatial functions such as housing, working and facilities posing often more stringent requirements on infrastructure). Because of mobility and spatial trends the use of the road network will be different from now in 20 years. Interacting with this are innovations regarding road transport and infrastructure, other transport modalities, mobility and spatial concepts.
- Regarding future-proof road networks, NRAs can control how they manage their own network (asset management) but can only partly control the demand of their networks (by e.g. traffic management, ITS, asset management). Concerning the latter, interactions are important with other modalities and networks as well as with spatial planning for which other parties are responsible. CEDR's members are looking for more *insights in interactions* with other transport networks, multi-modality, influencing demand and to increase the adaptability of road networks in order to achieve most effective use of their networks from a societal viewpoint now and in the future ('sweating the assets'). Effective use of existing road networks is especially important as in urban areas the space for extending road infrastructure is limited, expensive and therefore often not feasible. To accommodate changes, road networks and design need more adaptability and flexibility
- At this, NRAs have to *collaborate with other parties* – other transport authorities, planning administrations and private parties – as they are relevant when applying combinations of measures to manage their network and the demand for road networks. For instance concepts as seamless mobility, Mobility as a Service (MaaS) and shared mobility involve new types of parties. Insight is needed which parties are relevant in relation to the various futures trends and types of measures and how to collaborate with them.

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influence better to changes in *mobility behaviour* of people and changes in production of goods and logistics; 2) *informing* by smart application of information (technology) for better utilization of infrastructure and better traffic flows 3) efficient *traffic management* and maintenance existing infrastructure, 4) *coordination* between mobility measures and spatial development, and 5) *investments* in enlarging infrastructure capacity but with a focus on societal and economic added value and on sustainability and road safety.

Expected outputs:

- An *overview of future trends* in mobility and spatial development that builds on the abundance of existing information and that combines this with insights in (innovative) measures/concepts for effective approaches. This is also relevant input for prediction models.
- An *overview of innovative measures/concepts* to deal with growing mobility demand in Daily Urban Systems resulting in robust road networks. This 'catalogue' of generic concepts and solutions should clarify what measures have proved successful, given specific contexts – an overview of good practices and applications. This builds upon the idea that carefully managing road networks (NRA) and managing demand of the future (spatial planning) may result in effective and future-proof road networks.
- Given the overviews above about future trends and concepts/measures, a *vision* providing CEDR's members with insights in the road network of the future, the interactions with other transport networks, multi-modality, influencing demand and to increase the adaptability of the road network in order to achieve most effective use of their networks from a societal viewpoint now and in the future ('sweating the assets'). This vision should support NRAs in their decision-making about managing their networks and influencing demand in different urban contexts.
- As collaboration with other parties is vital for future-proof road networks, CEDR members need a *roadmap* (which may be combined with the vision above) that clarifies the route towards collaborative planning for future-proof road networks. This roadmap should:
  - Identify the who, how, when for collaboration (stakeholder management)
  - Identify success and failure factors regarding these
  - Clarify interactions with other modalities and networks as well as with spatial planning for which other parties are responsible. For instance, clarify how NRAs may promote active modes, public transport, spatial planning measures that limit car-mobility by influencing other stakeholders.
  - Clarify what measures have proved successful
  - Define future demand together with end-users
  - Be context-driven: urban context (core, sub-/peri-urban, inter-urban) as well as socio-economic, environmental context
- Providing an instrument for *disseminating the results*, for instance by guidance document(s), a website, a course etc. Also, providing recommendations how to administrate the results beyond the projects ending.

5.2 Topic B: Planning and designing the interface between (trans)national road networks and local transportation ('last mile')

CEDR's members manage the national road sections of the wider European transport network that links its urban and economic centres to each other and to the global market. Being the backbone of the transport network, roads are complemented by the other modes. A key consideration for CEDR's members in their contribution to the ambition for seamless door-to-door mobility and mobility as a service (MaaS) are the various *interfaces* for freight and passengers in the (peri-)urban areas of the Daily Urban System (DUS) where their networks link to the regional and local networks (access and egress to 'first and last-mile').

The effectiveness and efficiency of these interfaces determine to a large extent NRAs' social licence to operate as it is at the *DUS-level* that spatial and environmental conflicts (noise, air pollution, safety issues) are most pressing, and transport demand and subsequently congestion is most intense. Also, it and can be expected that the potential of socio-economic benefits of well-planned and -managed infrastructure and spatial development is the highest at the DUS level. Regarding this, intermodal links of road networks to other modes through hubs and terminals for freight as well as for passengers are crucial ('spokes and hubs').

To achieve a well-functioning interface of (trans)national road networks and local transportation for the 'last mile', there is need for careful planning, designing and coordination of multi-modal infrastructure and spatial development. In order to harvest the strength of collaborative planning, evidence-based *business cases* should be developed as examples to support the concept of collaboration and provide insights for practical implementation.

This research call addresses a more *(cost-)efficient and sustainable integration* of long-distance and last-mile freight and logistics in the DUSs and also taking into account passenger transport flows. The interface regards both the interactions between different transport modalities (multi-modal infrastructure, nodes and hubs) as well as the interaction of multi-modal infrastructure with spatial functions (such as housing, working, facilities, which compete with transport infrastructure for the same scarce space in urban regions).

By organizing *Living Labs* with different NRAs good practices, experiences and opportunities will be collected as well as deploying novel combinations of existing/new technologies, measures and services. The Living Labs will focus on road infrastructure, other mobility modes and spatial planning solutions that can effectively integrate efficient and sustainable transport for both freight logistics and passengers. The results of these Living Labs should address both short-term project benefits (duration, budget, and public support) and long-lasting benefits in terms of enhanced sustainability of infrastructure and mobility (network resilience, environmental and spatial quality, alternative fuels) in DUSs.

Scope: the interface of long-distance and local last-mile transportation in the (peri-)urban areas of the DUS; optimisation strategies for spatially integrated interfaces for both freight and passengers; optimisation of interaction between infrastructure for different transport modes and spatial development in relation to innovative mobility and spatial concepts / measures; innovative planning and designing solutions at the DUS; these solutions should be especially relevant from the perspective of the (trans)national road network (i.e. relevant to NRAs practice).

Main challenges:

- Insight in how to provide good multi-modal connections between long-distance and last-mile transport for both passengers and freight transport. What is the use of such innovative concepts as seamless mobility, shared mobility, mobility as a service (MaaS), Transit Oriented Development (TOD), Distribution Centres and Urban Consolidation

Centres for freight and logistics, compact city planning (enhancing nearness, promoting active modes)?

- What are good, efficient and sustainable, practices for interchanges between modalities and spatial development at the DUS level. How to improve intermodal links, access/egress, parking, hubs, multiple land-uses in relation to road assets? How to promote active modes (such as walking and cycling), the use of public transport and shared mobility? How to improve liveability and health, environmental and spatial quality at the DUS level. What (multi-modal) infrastructure and spatial planning measures and solutions are available to achieve this?
- How to enhance the potential socio-economic benefits of well-planned and managed infrastructure and spatial development at the DUS level; planning and designing solutions which are useful for planning and designing in which NRAs are involved. Clarifying the feasible concepts, designs and solutions – providing evidence-based the business cases.
- What are the consequences of such solutions for urban last-mile traffic and spatial development in urban regions and for the (trans)national road network managed by NRAs. How to optimise the service for road users at the interface (relating to concepts of seamless door-to-door mobility, mobility as a service).

Expected outputs:

- An *(documented) inventory of good practices* across Europe addressing: good connections between long-distance and last-mile transport for both passengers and freight transport; solutions for efficient and sustainable interchanges of different modalities and spatial development at the DUS level. This results in an overview of 'basic' measures and solutions[2]
- *Testing* of these measures and approaches in (for instance) Living Labs with NRAs and developing further these approaches from the perspective for the (trans)national road network managed by NRAs. This on-the-ground testing is important as tailor-made solutions are needed by smart combining the measures and approaches.
- Developing on basis of the inventory and testing, a *toolbox*, containing: 1) various basic measures, concepts and potential solutions for integration of multi-modal infrastructure and spatial development at the DUS level interface, as well as how these measures, concepts and solutions can be combined in integrated designs for multi-modal infrastructure and spatial development that are able to accommodate changes ('what'); and 2) approaches for combining these basic measures and solutions in specific contexts, addressing how to collaborate with different authorities and other parties involved – this relates to multi-level governance and institutional aspects ('how').
- A *vision* document for CEDR's members on strategies how to improve the connection between long-distance and last mile, and on how NRAs can combine and use the 'basic' solutions and measures for tailor-made designing and planning (of the interface at the DUS level). Regarding this provide also insights for NRAs to optimise the service for road users at the interface of infrastructure and spatial development (in relation to such concepts as seamless mobility and mobility as a service).
- Providing an instrument for *disseminating the results*, for instance by guidance document(s), a website, a course etc. Also providing recommendations how to administrate the results beyond the project's ending.

[2] When the research of this call on collaborative planning starts the results of the CEDR research programme 2015 'Freight and Logistics in a Multi-modal Context' will be available. Also, the Horizon2020 Coordination Support Action 'VitalNodes' will have started (see also Chapter 5).

5.3 Topic C: Assessing the added value from spatial development as a factor in infrastructure planning

In order to be able to assess and capture the value of spatial development in relation to infrastructure development, NRAs need an *improved understanding* of the relation between spatial development and multi-modal infrastructure development. Infrastructure development is influenced by spatial development and vice versa – conform the concept of the 'land-use transportation' feedback cycle. A major challenge is that infrastructure development is usually mainly seen from a costs point of view (construction, mitigation, management, maintenance costs) and that perceived benefits relate mostly to giving access or relieving congestion (such as directly monetarizable issues as value-of-time). Traditionally, cost-benefit analysis is done to assess investment decisions for infrastructure development. In contrast to this, in spatial planning business cases are made for deciding about development proposals which focus on the expected revenues for a location or region.

The broader benefits of infrastructure development are typically not seen as a *driver* in planning and evaluation processes. An important reason for this is the limited understanding of the interrelation between spatial development and infrastructure development and which added societal values might be created by integrated development. Insight in this driver should help in clarifying the societal relevance – the business case – of collaborative planning for NRAs (and their partners). This insight will also make clear how in collaborative planning the spatial development can be made (financially) co-responsible for the investments in infrastructural development or improvement that will be needed as a consequence – balancing costs and benefits among investors.

An integrated planning approach (one in which infrastructure development is reconciled with spatial development) calls for assessment of infrastructure investments beyond value-of-time, which addresses actual issues and future trends such as: climate change (CO2 reduction)[3], economic development potential, health[4], social cohesion and the spatial structure for future development of countries, as well as cities and rural regions.

As NRAs are responsible for infrastructure networks both in urban and rural regions, addressing the differences between these contexts is important and this has consequences for the assessment and capturing of values. Road networks have a different (potential) position in the transportation system in different contexts. In urban core areas the density of the urban fabric is high allowing for multi-modality that includes not only public transport but also active modes such as walking and cycling. In the surrounding urban regions public transport (metro, tram, bus, train) is an important element of the DUS transportation system if the urban fabric has sufficient density, while low-density sub-/peri-urban regions are more car-dependent as public transport is often not viable. In low-density rural areas car-dependency is high, making a good road network vital for social cohesion and socio-economic development of these regions. NRAs need integrated assessment approaches that take into account such different contexts in which they operate.

Scope: NRAs need the development of more inclusive methods for assessing costs and benefits of combined infrastructure and spatial development, which build upon existing

[3] Dealing carefully with these issues is increasingly important to NRAs. For instance, the EU has ratified the 'Paris agreement', binding under international law, in aim to lower the level of global greenhouse gas emissions. In transport, the targeted level of the emissions cannot be reached by technical solutions only, but only when optimizing the whole transport system. Optimizing the transport system is possible only by combining spatial development programs with the development of transport infrastructure. The next steps on fulfilment of the Paris Agreement are to prepare the first national programs for lowering emissions by the end of 2020.

[4] Regarding this, health relates not only to 'hard' aspects such as air quality, noise, safety, but also to 'soft' aspects such as visual and barrier impacts, preventing obesity, social cohesion, limited mobility options, overall quality of residential areas.

knowledge and approaches. These assessment methods need to take into the account the specific contexts at hand – country-wide, urban or rural regions. The methods should be fit for purpose: i.e., focusing on decision-making on investments by NRAs.

Main challenges:

- Need for improved *understanding* of the relation between spatial development at the one hand and multi-modal infrastructure development at the other. In addition, NRAs need to collect additional/new datasets, to provide them with an on-going understanding of the importance and influence of the different values on infrastructure investment decisions.
- How to *assess* the societal value of combined multi-modal infrastructure and spatial development for decision-making on investments. This relates to specific challenges of:
  - Assessment beyond value-of-time (e.g. costs of travel time loss), and monetary terms
  - Inclusive assessment addressing: economic-spatial structure for future development of cities or regions, social cohesion, health
  - How to carefully weighting these various aspects
  - How to take into account the specific contexts in which NRAs are working – country wide, urban and rural regions (core-periphery).
- How to *capture* the added value from combined infrastructure and spatial development. Subsequently, how to translate this added value as *a driving factor* for infrastructure planning – an added value that can be used in NRAs decision-making on combined spatial and infrastructure development.
- What are consequences of such inclusive assessment and capturing of added value for the *NRAs' responsibility* for road infrastructure development. How to balance the costs and benefits amongst investors (broader financing schemes).

Expected outputs:

- A *review* of the state-of-the-art literature and good practice cases of valuation and capturing of combined spatial and (multi-modal) infrastructure development – taking into account different contexts (urban and rural regional contexts).
  NB: Part C of this research call explicitly focuses not only on urban regions (the Daily Urban System) but also explicitly addresses rural regional contexts.
- On basis of the review, development of a *validated valuation tool* that addresses combined multi-modal infrastructure and spatial development, that enhances the broader decision-making process, that is context-specific (regarding both urban and rural regional contexts) and that is useful for NRA decision-making on infrastructure development. To be analysed and verified in specific cases in interaction with CEDR's members and key stakeholders from other infrastructure modalities and from the spatial development domain. Such an interactive setting can be used for testing and further developing the proposed tools.
- Providing an instrument for *disseminating the results*, for instance by guidance document(s), a website, a course etc. Also, providing recommendations how to administrate the results beyond the project's ending.
- A *vision* on capturing the added value from of spatial development in relation to infrastructure development planning, which focuses: on assessment and capturing approaches usable for NRAs; on how to clarify the business case for collaborative planning; on how to balance the costs and benefits amongst investors (co-financing); and on how these approaches can be seen in an overall framework approach (the latter relates to a vision how theme C can be related to A, B in NRAs' practice). On basis of this vision, give appropriate practical recommendations.

6 Overview of current and previous activities

A general overview of current and existing relevant research projects undertaken across Europe and other sources of information are outlined in Appendix A. These resources and subsequent reports will provide the starting point for proposals submitted in response to this Call and proposals will be evaluated on this basis. **Applicants must not duplicate existing results or on-going projects**. Proposals should be based on the outcomes and state-of-the-art identified in these projects listed below. Failure to take account of available research conclusions will disqualify proposals from this call.

This research of this call is building on current initiatives and activities, driving a validated common structured approach of good practices, guidelines, models and examples. E.g. the research will explicitly build on and use the results of the CEDR 2015 Transnational Research Programme on '*Freight & Logistics in a Multi-modal Context*' (especially part B of this research programme on optimising modal choice by integrated land use, freight and logistics) and complementing this with passenger transport and spatial-economic development issues, thereby extending the understanding and further developing tools. Full-scale application and validation will be building on a network of experts as a legacy by reinforcing the current community of practice (exchanging knowledge and experiences). The results of the CEDR research programme 2015 'Freight and Logistics in a Multi-modal Context' will be available when the research of this call on collaborative planning starts. Also, the Horizon2020 Coordination Support Action '*VitalNodes*' will have started, which focuses on giving the EC validated recommendations for a better and more effective integration of urban nodes into TEN-T corridors, thereby focusing on long-distance transport and last-mile freight logistics. CEDR supports the VitalNodes and aims at twinning of VitalNodes activities with the activities of this CEDR Call in order to create synergies. Closely related to this is the *NUVit* initiative ('Networking for Urban Vitality' – www.nuvit.eu), which focuses on the integration of multi-modal mobility, infrastructure- and spatial planning. This enables the synergetic integration of spatial development with investments in infrastructure (across all relevant scale levels: local, regional and corridor) in order to achieve the highest added value. The NUVit initiative aims at sustaining a network of practitioners, collecting best practices across Europe, and developing a proven toolbox for authorities to optimize economic, social and environmental vitality of urban regions from the perspective of multimodal transport infrastructures.

7 Additional information

The aim of this Transnational Research Programme is to provide applied research services **for the benefit of National Road Administrations** in Europe.

It is foreseen that project coordinators will meet the PEB to present the progress of the project once per year. Additionally, be prepared to submit papers to conferences (like TRA or FIRM). Consider these costs in your budget.

The target budget provided by the participating National Road Administrations for this programme is **EUR 900,000**.

Please refer to the **Guide for Applicants (GfA)** for full details of how to submit proposals in response to this Call.

Appendix A: Existing projects and resources

Europe wide

CEDR Transnational Research Programme

- **Call 2010 Effective Asset Management Meeting Future Challenges (completed)**
  Programme information, links to project deliverables and final report available at http://www.cedr.eu/era-net-road/call-2010-effective-asset-management-meeting-future-challenges/
- **Call 2011 Mobility (completed)**
  Programme information, links to project deliverables and final report available at http://www.cedr.eu/call-2011-mobility/
- **Call 2013 Traffic Management (completed)**
  Programme information, links to project deliverables and final report available at http://www.cedr.eu/call-2013-traffic-management/
- **Call 2014 Asset Management (near completion)**
  Programme information available at http://www.cedr.eu/cedr-call-2014/call-2014-asset-management-maintenance/ Final report and project deliverables due for publication c. end of 2017.
- **Call 2014 Mobility and ITS (near completion)**
  Programme information available at http://www.cedr.eu/cedr-call-2014/call-2014-mobility/ Final report and project deliverables due for publication in 2017.
- **Call 2015 Freight and Logistics in a Multimodal Context (on-going programme)**
  Programme information available at http://www.cedr.eu/call-2015-freight-logistics-multimodal-context/
  - FALCON project – Due for completion in 2018. Aims to provide NRAs with a clearly written handbook explaining the principles of freight markets, logistics strategies, and how multi-modal transport works and can be influenced.
  - FLUXNET project – Due for completion in 2018. Aims to provide insight into the tools for NRAs that help to optimise the multi-modal use of the infrastructure networks by the freight and logistic sector. Special attention is being paid to the connection between land use and infrastructure planning.

Other European

- **H2020 VitalNodes (on-going)**
  Giving the EC validated recommendations for a better and more effective integration of urban nodes into TEN-T corridors, thereby focusing on long-distance transport and last mile freight logistics. More information at: www.nuvit.eu
- **H2020 AM4INFRA (on-going)**
  Imply measures for Asset Management – standardisation, dissemination, policy dialogues, etc – where no research is involved. The CSA is a first step in delivering the mission that by 2025 various key European infrastructure agencies have implemented the Asset Management structure to ensure effective and efficient life cycle management of transport asset systems. Practitioners will be enabled to address various and often diverging trends in economy, society and environment (including governance issues of interaction between infrastructure and broader spatial development). For more information: http://www.am4infra.eu/
- **Netlipse**
  Research on best practices and lessons learnt in large infrastructure projects in Europe, focusing on all relevant phases of the project (from initiation to realization). The network is still active after ten years. For more information: http://netlipse.eu/

- **TRACC - ESPON 2013-programme**
  Transport Accessibility at Regional / Local Scale and Patterns in Europe, which is a analogous type of study as this research call but that focuses on the spatial perspective: https://www.espon.eu/main/Menu_Projects/Menu_ESPON2013Projects/Menu_AppliedResearch/tracc.html
- Logistics in the EU and multi-modal transport in the new TEN-T Corridors'' by the TRAN Committee.
- Gre-cor (ERDF) The North Sea Region Programme Secretariat http://www.trafikverket.se/en/startpage/operations/Operations-railway/GreCor---Green-Corridor-in-the-North-Sea-Region/ or http://results.northsearegion.eu/en/projects/Green-Corridor-in-the-North-Sea-Region.144/
- Swiftly Green https://www.swiftlygreen.eu/en founded by TEN-T/INEA
- Scandria®2act (ERDF) Interreg, Baltic Sea Region http://www.scandria-corridor.eu/index.php/en/projects/scandria2-act

National programmes

- **Finland**
  Urban Zones I, II, III, by Finnish Environment Institute, 2017
  - Travel related zones on urban development in Finland 1990 – 2040
  - Urban Fabrics, by Peter Newman, Leo Kosonen, Jeff Kenworthy
  - Theory of travel related urban fabrics: http://online.liverpooluniversitypress.co.uk/doi/abs/10.3828/tpr.2016.28?journalCode=tpr
  - Bemine project, by Aalto University & alt, New practises for strategic urban planning: http://www.demoshelsinki.fi/en/projektit/bemine-beyond-malpe-coordination/
    National Main Roads in Growing Cities, by Finnish Transport Agency, 2017
  - National transport network meeting expansion of cities

- **Norway**
  Study into the impacts of transport infrastructure investments on urban- and regional development (IMPACT), financed by the Norwegian Research Council and conducted under leadership of the Norwegian Institute of Transport economics (TOI.no): https://www.itf-oecd.org/sites/default/files/docs/02rtrinveste.pdf

- **Austria**
  Studies into improvement of the multi-modal interface of transport systems (in German): http://www.combinet.at/

- **Flanders**
  Examples of projects where infrastructure and spatial development are coordinated: Trajectory by the intendant for the "Ring: http://www.antwerpen.be/docs/Stad/Stadsvernieuwing/9746949_urbandevelopment_English.pdf
  4 tram connections to and around Brussels (Brabantnet) – integrated evaluation framework. http://deredactie.be/cm/vrtnieuws.english/News/1.1798375

- **Netherlands**
  'Beter Benutten' Programme ('Better use'): Government, regions and businesses are working together to improve road, waterway and railway accessibility in the busiest regions. One of the aims was reducing congestions at the busiest points by 20% in 2014 and using a package of around 300 practical and quantifiable measures. More information and a complete overview of the program: http://www.beterbenutten.nl/en